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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/602,814	06/23/2000	Masao Takeuchi	82493.0002	9608

7590
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09/27/2005

EXAMINER

KERNS, KEVIN P

ART UNIT PAPER NUMBER

1725

DATE MAILED: 09/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/602,814	Applicant(s) TAKEUCHI ET AL.	
	Examiner Kevin P. Kerns	Art Unit 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2005 and 16 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

[Handwritten mark]

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakemi et al. (US 5,890,283).

Sakemi et al. ('283) disclose an apparatus and method for mounting electrically conductive balls, the apparatus of which includes the following structures: a positioning mechanism, a ball supply device (with bottom area less than 80% coverage due to spherical packing), a ball transfer head, a spring (force energizing device that would generate force that is larger than the weight of the head), guide shafts (moving

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mechanism) for moving the ball transfer head in the x- and y-directions, a workpiece with associated positioning means, a vacuum unit to hold the conductive balls (in which the suction holes have bellows-shaped openings), an ultrasonic vibrator, and a flux/adhesive reservoir (abstract; column 1, lines 7-10 and 35-67; column 2, lines 1-10; column 3, lines 42-50; column 4, lines 1-10, 26-40, and 53-65; column 5, lines 13-30; column 6, lines 10-25; and Figures 1-8). The spring resiliently supports the head, and the head is lowered and raised appropriately for subsequent adhesion to flux or other adhesive (abstract; column 1, lines 52-67; column 2, lines 1-10; column 5, lines 30-48; and Figures 3-5). Pressing forces F1 and F2 are established for flux adhering and ball mounting steps, respectively (column 7, lines 19-26 and 66-67; and column 8, lines 1-30). One of ordinary skill in the art would have recognized that the use of a hammer rather than the ultrasonic vibrator would also result in dislodging of the conductive balls from the workpiece, as these dislodging means are well-known functional equivalents.

With regard to the clamping means and process to hold the energized force applied by the spring, one of ordinary skill in the art would have readily used the pressing force controller 62, in cooperation with rod 39 and springs 40, as a clamping means with (potential energy) energized force, such that the pressing force controller is capable of applying a clamping force with subsequent releasing of the force, at desired values, for the purpose of controlling the force on the springs that attach to the mounting head (abstract; column 4, lines 22-40 and 53-65; column 5, lines 13-30; column 6, lines 10-25; and Figure 2). Regarding the range of force values, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or

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working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. In this instance, the clamping force values are critical due to the fact that the solder balls would be inadequately clamped (not able to be transferred) with low force values, and would be damaged/crushed with high force values (rendering them unusable for semiconductor workpiece devices). In addition, one of ordinary skill in the art would have recognized that the structure of touch sensor 43 (rigid structure used for force measurement) functions as a rigid lower stop (rigid lower positioning stop 18 of application), which serves as a force generating device to store an energized force in combination with pressing force controller 62, rod 39, and springs 40, the combination of which is inherently operable to prevent vibration of the head (due to clamping with a sufficiently strong force that would necessarily be larger than the upward force of the head) during movement of the head (column 4, lines 22-40 and 53-65; column 6, lines 10-25; and Figure 2).

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakazato (US 5,768,775).

Nakazato ('775) discloses a mounting apparatus and method of mounting conductive balls, in which the apparatus includes the following structures: a positioning mechanism, a ball supply device (with bottom area less than 80% coverage due to spherical packing), a ball transfer head, a spring (force energizing device that would generate force that is larger than the weight of the head), guide shafts (moving mechanism) for moving the ball transfer head in the x- and y-directions, a workpiece

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with associated positioning means, a vacuum unit to hold the conductive balls (in which the suction holes have bellows-shaped openings), an ultrasonic vibrator, and a flux/adhesive reservoir (abstract; column 1, lines 7-9 and 40-67; column 2, lines 1-8 and 24-67; column 3, lines 1-67; column 4, lines 1-30; and Figures 1-3). The spring resiliently supports the head, and the head is lowered and raised appropriately for subsequent adhesion to flux or other adhesive (abstract; column 1, lines 46-56; column 2, lines 33-42 and 51-62; column 3, lines 35-42; and Figures 1-3). One of ordinary skill in the art would have recognized that the use of a hammer rather than the ultrasonic vibrator would also result in dislodging of the conductive balls from the workpiece, as these dislodging means are well-known functional equivalents. With regard to the clamping means and process to hold the energized force applied by the spring, one of ordinary skill in the art would have readily used the pressing force controller 62, in cooperation with rod 39 and springs 40, as a clamping means with (potential energy) energized force, such that the pressing force controller is capable of applying a clamping force with subsequent releasing of the force, at desired values, for the purpose of controlling the force on the springs that attach to the mounting head (abstract; column 2, lines 34-42 and 51-62; column 3, lines 6-17 and 65-67; column 4, lines 1-11; and Figure 2). Regarding the range of force values, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233. In this instance, the clamping force values are critical due to the fact that the solder balls would be inadequately clamped (not able to be transferred) with low force

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values, and would be damaged/crushed with high force values (rendering them unusable for semiconductor workpiece devices). In addition, one of ordinary skill in the art would have recognized that the structure of touch sensor 43 (rigid structure used for force measurement) functions as a rigid lower stop (rigid lower positioning stop 18 of application), which serves as a force generating device to store an energized force in combination with pressing force controller 62, rod 39, and springs 40, the combination of which is inherently operable to prevent vibration of the head (due to clamping with a sufficiently strong force that would necessarily be larger than the upward force of the head) during movement of the head (column 2, lines 51-62; column 3, lines 6-17 and 65-67; column 4, lines 1-11; and Figure 2).

Response to Arguments

5. The examiner acknowledges the applicants' amendment and the request for continued examination, which were received by the USPTO on April 18, 2005 and August 16, 2005, respectively. It is also noted that the applicants' petition for correction of the filing date (to establish June 23, 2000 as the filing date) has been granted.

Claims 1-4 remain under consideration in the application.

6. Applicants' arguments filed April 18, 2005 have been fully considered but they are not persuasive.

With regard to the applicants' arguments on pages 4 and 5 of the amendment, the examiner respectfully disagrees with the applicants' contention that both the Sakemi

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et al. and Nakazato references (see their respective Figure 2's), do not include the amended claim 1 limitations "by a power that is larger than the weight of said head" and "that is larger than the head's upward force", as related to the energized force generating device (springs). Details of these new limitations are cited in the newly underlined portions of paragraphs 3 and 4. The springs 40 of both Figure 2's of the 35 USC 103(a) references appear to be substantially the same as springs 16 of the applicants' Figure 4. The springs 40 of Sakemi et al. and Nakazato would necessarily have a yield strength at least somewhat greater than the maximum force the head would acquire, or a permanent deformation or breakage of at least one of the springs 40 would occur. With regard to prevention of vibration (as it relates to the springs), the applicants' ball mounting apparatus appears to be substantially similar to those of Sakemi et al. and Nakazato, and it continues to be unclear which one (or more) of the x, y, or z axes of the prior art references would contain vibration. What structural feature(s), in combination with the applicants' use of "stronger springs", in the applicants' apparatus would prevent such vibration? The applicants are respectfully requested to distinguish one or more structural difference(s) that would prevent vibration in one or more of the x, y, or z axes. In addition, the examiner notes that the applicants' Figure 4 appears to be structurally distinguishable from the Figure 2's of Sakemi et al. and Nakazato with regard to the upper positioning stop 19 protruding downwardly from case 14 of the applicants' Figure 4.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 9/22/05*
Primary Examiner
Art Unit 1725

KPK
kpk
September 22, 2005